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## Development and Testing of the Alzheimer's Disease and Related Dementias Mood Scale

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### Abstract

**Background**—Existing mood measures for individuals with Alzheimer's disease and related dementias (AD-RD) focus primarily on negative moods, including depression.

**Objective**—The objectives of this study were to design and test a new measure of both positive and negative moods in individuals aged 55 years or older with mild to severe AD-RD.

**Methods**—Formal and informal caregivers' observations of mood in this population generated 26 positive and 27 negative mood descriptors reviewed by content experts before pilot testing. The AD-RD Mood Scale and Mini-Mental State Examination were administered to 298 participants with very mild to severe cognitive impairment. Two examiners simultaneously rated a subsample of participants, a second subsample was retested after 2 weeks, and additional mood measures were administered to a third subsample.

**Results**—The final AD-RD Mood Scale contains 34 items in two positive subscales (spirited and contented) and three negative subscales (hostile, apathetic, and sad). The five subscales explain 82% of the variance. Cronbach's alpha values were .92, .90, .85, .77, and .73 for the spirited, hostile, contented, apathetic, and sad subscales, respectively. Interrater reliability ranged from .88 to .63. Mean subscale scores were stable over time. Moderate to strong validity coefficients (Pearson's *r*) produced by comparison with four existing measures were in the hypothesized direction. Subscale scores discriminated between participants who are depressed and those who are nondepressed.

**Discussion**—The final 34-item AD-RD Mood Scale provides useful data on both positive and negative moods of individuals with AD-RD. Further evaluation of reliability and validity in a multiethnic sample is recommended, as are confirmatory factor analysis and expansion to add subscales related to tension and social unease.

### Keywords

Alzheimer's disease; dementia; measurement; mood

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Measurement of mood in individuals with Alzheimer's disease and related dementias (AD-RD) is challenging because declining language capability limits self-report of mood states.

Measures of mood based on observer ratings are generally more practical for individuals with AD-RD, particularly in the late stages.

Most of the mood and emotion measures that have been developed for this population are focused on negative mood and measurement of the symptoms of depression (Sunderland et al.,

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1988). Several measures contain a limited number of positive items (Albert et al., 1996; Ready, Ott, Grace, & Fernandez, 2002). Many are not designed for the individual with moderate to severe impairment (Brod, Stewart, Sands, & Walton, 1999). A comprehensive measure that captures both positive and negative moods can be used to describe mood states across the stages of the disease and to track progress in clinical programs or intervention research in which improved mood is the desired outcome. The purpose of this article is to describe the development and testing of a new measure of both positive and negative moods for individuals with mild to advanced AD-RD.

## Conceptual Framework

Although often used interchangeably, the terms *emotion*, *affect*, and *mood* refer to different characteristics of feeling states. Emotions are intense, brief feeling states that arise in response to a particular stimulus. Moods are more enduring but generally are less intense global states (Schulz, 1982). Moods and emotions vary in intensity (degree of arousal), frequency, direction (inward focus toward self or outward toward the environment), and duration. They may be communicated to others via behavioral indicators, either verbal or nonverbal (facial expression, voice, or gestures). Affect is the general valence (positive or negative) of that state and accounts for much of the variance in the state (Guerrero, Andersen, & Trost, 1998).

The question of whether older adults with advanced stage dementia are capable of feeling emotions has been understudied (Cotrell & Schulz, 1993). There is some disagreement in the literature on the degree to which individuals with severe impairment experience complex moods or psychiatric disorders as opposed to *simpler equivalents* of these disorders. Cohen (1991) proposed that individuals with late-stage dementia experienced separation from self, implying loss of the capacity for emotions that characterize the human experience. More recently, researchers have used innovative approaches to understanding the emotional experience of individuals with dementia. Kolanowski, Litaker, and Catalano (2002) used a case study approach to examine mood and affect over time in an individual with dementia who lived in a dementia care unit. Using a phenomenological approach, Parsons-Suhl, Johnson, McCann, and Solberg (2008) uncovered experiences of terror and loneliness in 12 individuals with memory loss. In contrast, staff and family members who had close contact with older adults residing in two dementia care units reported a wide range of moods in this population (Tappen & Williams, 1998). From the caregiver's perspective, residents' moods were identified readily. The AD-RD Mood Scale was developed from their descriptions.

## General Mood Measures

A number of scales developed to detect depression in cognitively intact older adults have been used with individuals evidencing mild to moderate cognitive impairment. The Geriatric Depression Scale (GDS) was designed as a basic screening tool (Brink et al., 1982) and has been used extensively as a screening tool and outcome measure (Storandt, 2005; Adams, 2001). In their original report on the development of the 30-item scale, Yesavage et al. (1983) reported that internal consistency (coefficient alpha) was .94. Test-Retest scores were correlated significantly ( $r = .85$ ). The GDS was found to discriminate between individuals who are normal, mildly depressed, and severely depressed. Many researchers have reported similar levels of reliability and validity (Jang, Clay, Roth, Haley, & Mittelman, 2004; Watson & Pignone, 2003). Using the 30-item GDS, Williams, Rittman, Boylstein, Faircloth, and Haijing (2005) reported acceptable reliability ( $\alpha = .89$ ) in a sample of male veterans 1 month after stroke. In a sample of 85 nursing home residents, Blank, Gruman, and Robison (2004) reported 83% sensitivity and 80% specificity for detecting depression with the 15-item version of the GDS when compared with those of a structured diagnostic interview. Using the 5-item GDS with older adults with mild cognitive impairment, Storandt (2005) found very poor sensitivity

(34%) which was attributed to their difficulty with accurate reporting. Because the scale requires a written or verbal response to items, it cannot be used reliably when verbal abilities are severely affected by AD; thus, researchers have excluded individuals with a Mini-Mental State Examination (MMSE) score below 15, indicative of moderate dementia (Folstein, Folstein, & McHugh, 1975; MacRae et al., 1996).

Logsdon and Teri (1995) adapted the Beck Depression Inventory (BDI) so that family caregivers could act as surrogate respondents on behalf of the individual with more advanced dementia. The scale contains 21 groups of statements relating to cognitive-affective and somatic indicators of depression. Caregivers choose one out of each group that best describes the way the participant has been feeling during the last 7 days based on what he or she believes the individual would report if able. In a sample of 73 older adults recruited for a behavioral study of depression and dementia, the BDI (surrogate format) correlated well with GDS scores (.80). Also used in studies of individuals with AD, the Montgomery-Asberg Depression Rating Scale (MADRS; Montgomery & Asberg, 1979) was designed for rating depression in nondemented individuals. In a cross-sectional study of Swedish older adults aged 85 to 95 years (Bergdahl et al., 2005), the MADRS was used to confirm depression in participants with no impairment and mild to moderate cognitive impairment. Those who had dementia were more likely to be depressed ( $p < .001$ ).

## Dementia-Specific Measures

The Dementia Mood Assessment Scale (DMAS; Sunderland et al., 1988) is a 24-item scale that rates observable mood and functional abilities. The first 17 items measure mood, whereas the remaining items measure severity of dementia. All but two items, sense of enjoyment and self-esteem, address negative moods. Sunderland et al. (1988) tested the instrument in a sample of 21 individuals diagnosed with dementia of the Alzheimer's type who were hospitalized to participate in a drug study. Scores were found to be significantly correlated with global measures of depression ( $r = .73$ ) and sadness ( $r = .65$ ; Sunderland et al., 1988). Older adults with Alzheimer's disease (AD) may have limited insight and limited verbal skills; thus, some items such as guilt feelings and suicidal ideation may be difficult to rate. Psychosomatic complaints are also unlikely to be self-reported as such and require assessment by a mental health professional.

The Cornell Scale for Depression in Dementia (CSDD) is a 19-item instrument designed to rate depressive symptoms in participants with dementia based on caregiver report and participants' interviews (Alexopoulos, Abrams, Young, & Shamoian, 1988). In a large sample of randomly selected nursing home residents, Barca, Selbaek, Laks, and Engedal (2008) found that nursing home residents with AD had higher (more depressed) Cornell scale scores at every stage of dementia as compared with the scores of those who were cognitively intact. In a recent comparison of three scales used to measure the effects of an antidepressant on depression in AD, the Cornell scale evidenced a larger effect size and was more likely to detect significant results (Mayer et al., 2006). A disadvantage of the Cornell scale is that some items describing vegetative signs of depression could also be indicators of dementia severity. Lee, Strauss, and Dawson (2000) addressed this issue by including only the nonvegetative items. Several items are difficult to assess in individuals with severely limited verbal skills (e.g., suicidal wishes, multiple physical complaints, and pessimism).

The Dementia Mood Picture Test (DMPT; Tappen & Barry, 1995) was designed to measure positive and negative moods in participants with severe impairment. To simplify administration, the instrument is limited to three negative and three positive moods commonly referred to as *primary* in the literature. To provide additional channels through which information may be comprehended, large line drawings with the descriptors printed in 2-in.

high letters are placed before the individual as each question is asked. Participants are asked whether or not they are experiencing each mood (“Are you in a good mood?”) and the intensity of that mood. This test is unusual in that it is designed to obtain the response of the individual with dementia directly, but it is limited to six primary moods. The scale has high interrater reliability (.95-1.00) and correlates in the expected direction with the Montgomery-Asberg Rating Scale ( $r = -.51$ ). In a case study design, Kolanowski et al. (2002) used the DMPT to examine mood three times daily for 35 days. They found that the participants' overall reports of mood were consistent and stable over time. Reports of “good mood” were more consistent than reports of “bad mood.”

Lawton, Van Haitsma, and Klapper (1996, 1999) developed the Observed Affect Rating Scale (OARS) to study quality of life in nursing home residents with dementia. The six-item OARS measures three positive emotions (pleasure, interest, and contentment) and three negative emotions (sadness, anxiety, and anger). An observer rates the frequency of expression of each emotion first over a 10-minute period of direct observation and then the individual's mood over the last 2 weeks. Contentment and interest were observed most frequently; anger was least often observed. Interrater reliability scores were satisfactory (.76 to .89). Validity was supported by comparisons between long-term care residents who are cognitively impaired and those who are unimpaired. Unimpaired individuals were rated as more anxious. Discriminant validity was evidenced by staff's ratings, showing that sad and anxious residents were less likely to be rated as showing pleasure and contentment. This scale is also limited in the range of emotions that it measures.

Ready et al. (2002) developed the Cornell-Brown Scale for Quality of Life in Dementia to measure treatment outcomes. The rating scale is based on an interview with patient and caregiver and measures multiple dimensions of quality of life including positive and negative mood indicators. Four positive (comfort, happiness, enjoyment of life's pleasant events, and tolerance) and four negative (anxiety, sadness, lack of reactivity to pleasant events, and irritability) mood-related signs are included. The scale has been tested on 50 patients with memory impairment (mild to moderate impairment) and their caregivers from a hospital-based outpatient clinic. The authors reported good internal reliability (.81) and validity ( $r_s = .63$ ,  $p < .01$ ) based on comparison with those of patients' self-ratings on a visual analogue scale, with a cartoon representation of sad at one end and happy at the other.

In summary, most researchers who have measured mood in elders who are cognitively intact and cognitively impaired have focused on the measurement of negative rather than positive moods. Several instruments designed for unimpaired older adults, including the GDS, the MADRS, and the BDI (surrogate format), have been used in individuals with cognitive impairment. Other instruments have been designed specifically for the older adult with dementia but measure primarily negative mood (DMAS and CSDD). The DMPT, the OARS, and the Cornell-Brown Scale for Quality of Life in Dementia measure positive moods or emotions but are limited to three or four positive items per instrument.

Two additional limitations of existing instruments are the abstract nature of many items and the inclusion of vegetative symptoms. In the DMAS, for example, raters are required to conjecture about whether an individual feels inferior, guilty, or pessimistic. Individuals with advanced dementia cannot reliably express such specific complex feelings. Porsteinsson, Tariot, and Schneider (1997) describe the difficulties in comparing research outcomes due to inconsistency in what is considered an indicator of mood. The combination of vegetative symptoms with behavioral and subjective symptoms and the possibility of overlap between mood, symptoms of dementia, and the effect of comorbid illnesses frequently extant in this older population lead to inconsistency in ratings. There is a critical need for a comprehensive

outcome measure composed of concrete, observable mood indicators encompassing the full range of positive and negative moods.

## Methods

### Test Development

Items for the AD-RD Mood Scale were derived from a qualitative study of family members' and formal caregivers' descriptions of the moods of individuals with moderate to severe AD (Tappen & Williams, 1998). Family members and formal caregivers who were in frequent contact (minimally once weekly) with care recipients residing on an Alzheimer's special care unit or attending an Alzheimer's day care center in Tucson, Arizona, were asked to describe how individuals with moderate or severe probable AD communicated their moods. Comparison of the 20 family members' responses with the 19 care-giving staff members' responses was done for verification purposes.

All items derived from the caregiver interviews were mentioned by at least two respondents and supported by either the literature on mood in AD or onsite structured observations that were done over 4 months as a supplement to the interviews.

**Content Validity**—The completed instrument was reviewed by two content experts in dementia care and research. Modifications were made to the instructions and scoring as a result. Items were also evaluated for conceptual redundancy. Thus, safe and secure were combined into one item, but likes to do things and likes to be busy were retained as separate items based on their recommendations.

Grounded in qualitative data and the theoretical literature, the resulting 53 items represent a wide range of positive and negative moods and mood indicators rather than focusing on symptoms of pathology such as suicidal ideation or the vegetative signs of depression.

The original test version of the AD-RD Mood Scale was a 53-item Likert scale. Each mood descriptive item is rated from 1 (*never exhibited*) to 5 (*always exhibited*) based on the rater's direct observation of the individual, the individual's responses during the testing session, and information from informants (informal and formal caregivers) about the individual's moods over the previous 7 days. The 53 items were divided into positive (26 items) and negative (27 items) subscales.

### Psychometric Testing

The AD-RD Mood Scale has been tested on 298 older individuals (aged 55+ years), representing a range from *very mild* to *severe cognitive impairment*. This testing was done in a series of psychometric and interventional studies. All studies were approved by the University Committee for the Protection of Human Studies and by such committees of the host institution where applicable. Individuals capable of understanding the purpose of the study and meaning of consent provided their own consent. Responsible family members or legal guardians provided consent for the remainder. For these participants, their assent to participate was obtained as well.

**Study Measures**—In all four of the studies, the AD-RD Mood Scale and MMSE (Folstein et al., 1975) were administered. The MMSE is a widely used measure of cognition. Validated against clinical diagnosis, the MMSE tests orientation, attention, registration, calculation, recall, and language. High (.89) test-retest reliabilities have been reported. It has been reported to discriminate individuals who are demented from individuals who are nondemented (Overall, 1989) and to be useful in staging dementia (Pernecky et al., 2006). In Study 3, participants



were rated also on the DMAS (Sunderland et al., 1988), CSDD (Alexopoulos et al., 1988), MADRS (Montgomery & Asberg, 1979), and the 2-week subscales of the OARS (Lawton et al., 1999). Psychometric properties of these scales were presented in an earlier section.

**Sample**—The four studies were as follows.

Study 1 was the first test of the AD-RD Mood Scale conducted in a dementia-specific day center and two skilled nursing facilities. Forty-four individuals aged 61 to 94 years ( $M = 79$  years,  $SD = 8.37$  years) with cognitive impairment as evidenced by their medical record and an MMSE score of 24 or less were tested. Twenty (45%) were men, and 24 (55%) were women. Their MMSE mean score was 7.88 ( $SD = 6.47$ ) and ranged from 0 (*very severely impaired*) to 23 (*mildly impaired*) out of a possible 30. Six (14%) were Hispanic, two (5%) were African American, the remainder (81%) were European American. Other than formatting, no substantive changes were made in the instrument because of this pilot study.

Studies 2 and 3 were intervention studies of 77 and 120 residents, respectively, of nursing home and assisted living facilities who met the National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association criteria for the clinical diagnosis of AD (McKhann et al., 1984). The average age of the 77 nursing home residents in Study 2 was 87 years ( $SD = 6.70$  years, range = 70-105 years). Their average MMSE was 9.89 ( $SD = 6.04$ ), with a range of 0 to 26. Twelve (16%) were men, and 65 (84%) were women. Seventy-five (97%) were European American; 2 (3%) were African American. Their average length of stay in the nursing home was 1,062 days ( $SD = 847$ ), with a range of 329 to 4,310 days.

The average age of the 120 nursing home and assisted living residents in Study 3 was 87.73 years ( $SD = 6.04$  years), with a range of 70 to 100 years. Twenty-one (17%) were men; 99 were women (83%). All met the National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association criteria for clinical diagnosis of AD. Mean MMSE was 10.15 ( $SD = 7.51$ , range = 0-29). One hundred (83%) were European American, 18 (15%) were Hispanic, and 2 (2%) were African American. The average length of stay was 808 days ( $SD = 759$  days, range = 29-5,354 days). Baseline data from these two intervention studies were used for this analysis.

Study 4 involved additional testing of the AD-RD Mood Scale and other instruments. Fifty-seven additional community-dwelling and institutionalized individuals with an MMSE of 24 or less were tested in Study 4. Their average age was 79.33 years ( $SD = 9.22$  years), with a range of 55 to 96 years. Average MMSE was 17.21 ( $SD = 5.98$ , range = 3-24). Twenty-eight (49%) were men, and 29 (51%) were women. All were European American. Approximately half lived in low-income housing. The remainder resided in long-term care facilities.

When the four study samples are combined, the total sample of 298 individuals had an average age of 84.75 years ( $SD = 8.26$  years, median = 85 years, range = 55-105 years). Eighty-one (27%) were men; 217 (73%) were women. Altogether, 268 (90%) were European American, 24 (8%) were Hispanic, and 6 (2%) were African American. Using Folstein's (1997) three-stage typology corresponding to MMSE scores to further describe the sample, 126 (42%) were in the late stage (MMSE <10), 115 (39%) were in the middle stage (MMSE 10-19), and 57 (19%) were in the early or mild stage of AD-RD (MMSE 20-30).

## Procedures

All measures were administered during a single session lasting 0.5 hours in Study 1 and a maximum of 2.5 hours in Studies 2, 3, and 4. In Study 2, two examiners rated a subset of 25 participants simultaneously to assess interrater reliability. In Study 4, 39 participants were

retested 2 weeks later to assess test-retest reliability. Raters received 2 days of training, including 1 day of didactic content covering types of cognitive impairment, stages of decline, and related changes in communication capability, including verbal and nonverbal expression of mood and affect. On the second day, they observed an experienced rater complete one or more ratings and practice in simulated situations with volunteer older adults. Their performance was then evaluated by one of the investigators for achievement of acceptable level of competency in a testing session before they were allowed to conduct these sessions independently.

## Results

### Item Analysis

For purposes of analyzing the individual items and their interrelationships, examiners' ratings on the 298 participants from the four studies were combined.

Initial item analysis was done on the a priori positive and negative subscales. Standardized Cronbach's alpha values were .93 (positive subscale) and .91 (negative subscale), indicative of acceptable homogeneity. Item-to-total correlations ranged from -.18 to .78 on the positive subscale and .15 to .74 on the negative subscale. Little item redundancy was found within the subscales; none exceeded .80. Several interitem correlations within the subscales approached 0 or were negative. The strongest negative correlation was the item quiet relative to that of the item talkative ( $r = -.55$ ). The items calm and energetic were related negatively as well ( $r = -.11$ ). On the negative subscale, the item embarrassed had a negative relationship to the item lost ( $r = -.14$ ).

These negative and near-zero interitem correlations suggested a more complex structure. Responses to the original 53 items were subjected to exploratory factor analysis employing squared multiple correlations as prior communality estimates followed by oblique rotation and the Procrustean transformation (Hatcher, 1994). The Scree test evidenced large breaks between Factors 2 and 3 and Factors 7 and 8. The eigenvalue 1 or Kaiser criterion suggested a seven-factor solution as the Factor 7 eigenvalue was 1.12 and the Factor 8 eigenvalue was .73. Items with factor loadings of .40 or greater were said to load on that factor. Forty-one items loaded on one of the seven factors, 12 did not and were deleted. No items exceeded .40 on more than one factor. Factor 7 contained only 2 items (agitated and tense) and was deleted. Three items loaded on Factor 6 (worried, embarrassed, and afraid will be laughed at). Deletion of one item raised the coefficient alpha from .66 to .68, still below the desired level of .70 for a new instrument (Nunnally & Bernstein, 1994). Factor 6 was deleted. The cumulative common variance explained by the five retained factors is 82%.

The five factors were modified on the basis of further within-factor interitem analysis. Two items with interitem correlations under  $r = .15$  were deleted. Factor 1 contained one item, energetic, that met this criterion. Deletion of this item raised the alpha coefficient from .91 to .92. Factor 4 also had one item, bored, that met this criterion. Deletion of this item raised the alpha coefficient from .75 to .77.

Factor 1, spirited, contains 12 items (Table 1) that reflect high energy directed outward with a positive valence. Item-to-total correlations ranged from .49 to .75. Interitem correlations ranged from .19 (wants attention, bright and alert) to .82 (likes to do things and likes to be busy).

Factor 2, hostile, contains eight items that reflect high energy directed outward with a negative valence. Item-to-total correlations ranged from .53 to .85. Interitem correlations ranged from .35 to .79. The item cooperative is reverse scored.

Factor 3, contented, contains five items reflecting a balance in inward- and outward-directed energy and a positive valence. Item-to-total correlations ranged from .60 to .69. Interitem correlations ranged from .43 to .64.

Factor 4, apathetic, contains five items reflecting very low energy, inwardly directed, with a negative valence. Item-to-total correlations ranged from .40 to .68. Interitem correlations ranged from .20 to .55. Part of the original positive subscale, the items attentive and quiet loaded on this subscale. Attentive is reverse scored, whereas quiet is not.

Factor 5, sad, contains four items reflecting inwardly directed energy with a negative valence. Item-to-total correlations ranged from .39 to .63. Interitem correlations ranged from .20 to .60.

The final AD-RD Mood Scale has five subscales and 34 items. The themes reflected by the items that loaded on each of the five retained factors were used to name the subscales: spirited, hostile, contented, apathetic, and sad (Table 2).

### Reliability Estimations

Interrater reliability was evaluated on Study 2 data for the five subscales. Interrater reliability of the spirited subscale was  $r = .88$ ; it was .79 for the hostile subscale, .67 for the contented subscale, .76 for the apathetic subscale, and .63 for the sad subscale. For comparison purposes, participants were also rated by the two examiners on the MADRS (Montgomery & Asberg, 1979), yielding an interrater reliability of  $r = .79$ .

Test-Retest reliability over 2 weeks was done utilizing Study 4 data. Test-Retest reliability of the spirited subscale was  $r = .73$ ; for the hostile subscale, it was also  $r = .73$ ; it was  $r = .63$  for the contented subscale,  $r = .72$  for the apathetic subscale, and  $r = .77$  for the sad subscale. Mean scores were also stable over time. Analysis of variance indicated no significant differences across the two testing sessions (Table 3).

Subscale homogeneity (internal consistency) was assessed by calculating coefficient alpha (Cronbach, 1941) on the total sample of 298. Reliability estimates were .92, .90, .85, .77, and .73 for the spirited, hostile, contented, apathetic, and sad subscales, respectively. Subscale homogeneity was further assessed by stage of dementia. Reliability estimates were .90, .79, .85, .71, and .71 for the spirited, hostile, contented, apathetic, and sad subscales for those in the early stage of dementia. Reliability estimates were .92, .88, .84, .63, and .79, respectively, for those in the middle stage and .90, .88, .84, .76, and .69, respectively, for those in the late stage of dementia (Table 4).

### Construct and Predictive Validity

Construct validity, the degree to which a measure relates to other measures consistent with theory-based hypotheses about the construct being measured (Carmines & Zeller, 1979), was assessed by comparing the five subscale scores with scores on the DMAS, CSDD, MADRS, and OARS 2-week negative and positive subscales (Table 5). Baseline data on 87 participants who completed the intervention in Study 3 were used for this analysis. Moderate to strong positive validity coefficients (Pearson's  $r$ ) were found between the two positive subscales of the AD-RD Mood Scale, spirited and contented, and the positive subscale of the OARS. Negative validity coefficients were produced by the comparison of these positive subscales with the remaining depression and mood scales. Conversely, comparison with the positive subscale of the OARS produced moderate to strong negative validity coefficients with the remaining three negative subscales—hostile, apathetic, and sad—and positive validity coefficients when compared with those of the depression and mood scales. All of these comparisons were statistically significant ( $p < .05$ ), and all were in the hypothesized direction.



Predictive validity, the relationship between a predictor (the 5 subscales) and a criterion event occurring before, during, or after the predictor is applied (Nunnally & Bernstein, 1994), was estimated using the same baseline data from Study 3 (Table 6). Participants were divided into depressed and not depressed groups on the basis of their CSDD scores of  $<7$  and  $\leq 7$ , respectively. Significant differences in scores between the depressed and not depressed groups were found on all five AD-RD Mood Scale subscales. As predicted, means of the spirited and contented subscales were lower for the depressed group, and means for the Hostile, Apathetic, and Sad subscales were higher for the depressed group. Subscale means were compared also across stages of dementia. Analysis of variance indicated significant differences in mood level across the three stages for all but the sad subscale. Early-stage participants had higher positive (spirited and contented) and lower negative (hostile and apathetic) mean scores than did later stage participants (Table 7).

## Discussion

Derived from formal and informal caregivers' descriptions of the moods they observed in individuals with AD-RD, 53 items were generated for the test version of the AD-RD Mood Scale. Exploratory factor analysis with oblique rotation and additional item analysis resulted in a 34-item instrument with five subscales: spirited, hostile, contented, apathetic, and sad.

The AD-RD Mood Scale was tested on community-dwelling and institutionalized older adults (aged 55 years and older) with very mild to severe cognitive impairment levels. Interrater reliability was comparable with that of a well-established measure of depression, the MADRS. Test-Retest results evidenced stability over 2 weeks, indicating that the scale measures moods of some duration, not less stable emotional responses. The internal consistency of the subscales was within the acceptable range for a new instrument, .73 to .92 for the sample as a whole (Nunnally & Bernstein, 1994). The apathetic subscale internal consistency fell below .70 in the moderately impaired subsample, and the sad subscale fell below .70 in the subsample with severe impairment.

The AD-RD Mood Scale was designed to produce a profile of the moods most commonly encountered in individuals with AD-RD. Efforts to establish validity of the scale began with the derivation of items from empirical data. The scale is grounded in the observations of those most familiar with the moods of individuals with AD-RD. Before testing the new instrument, the content and format were reviewed by two experts.

Validity was tested further by comparison with that of established tests of mood and depression. All of the resulting validity coefficients were significant and in the hypothesized direction. The subscale scores were compared in individuals who are depressed versus those who are nondepressed from Study 3. The differences between the two groups were significant on all five subscales and in the hypothesized direction. They were compared also across the stages of AD-RD, indicating significantly more positive and less negative mood in the early stage (MMSE  $\geq 20$ ) on all but the sad subscale.

Most of the instruments currently used to measure emotion, mood, or depression in the older population with AD-RD were tested on small samples. None of the published reports included factor analytic assessment. Predictive validity tests were relatively weak, based on challengeable assumptions, or both; for example, nondemented individuals would evidence more anxiety. Many include items related to vegetative symptoms and abstractions that require insight in the part of the individual with AD-RD. Positive mood items typically are limited in number or not included.

Limitations in testing the AD-RD Mood Scale include the small samples used to evaluate interrater reliability and test-retest stability over time. Clinical diagnoses were not available

on community-dwelling participants, only a global measure of cognition (the MMSE). The numbers of Hispanic and African American participants were too small for separate analysis. Further testing on a multiethnic sample should be done.

A limitation on clinical use of the AD-RD Mood Scale is that it requires trained raters. Extensive training (described earlier) and at least a moderate level of skill in communicating with the those with severe impairment and in interpretation of the expression of mood in individuals with communicative dysfunctions are needed for accuracy and consistency in scoring.

Although dysphoric mood and depression have been linked to poor health outcomes, the role of optimism and positive mood states in health has been understudied (Ostir, Markides, Black, & Goodwin, 2000). In a longitudinal study, Ostir et al. (2000) found a relationship between positive affect measured by four items such as "I was happy" and functional ability, supporting the importance of addressing both positive and negative states. Further study is needed to explore the links between quality of life in persons with AD-RD and positive moods such as spirited and contented.

The items constituting the two factors that were deleted suggest direction for further expansion and retesting of the AD-RD Mood Scale. Additional item generation related to Factor 6, which is characterized by tension without the outwardly directed aggression and irritability of the hostile subscale, and Factor 7 embarrassment and self-consciousness (implying discomfort in social situations and awareness of their cognitive limitations) should be done. Confirmatory factor analysis of the five subscales utilizing another large sample of individuals with AD-RD is also needed.

The AD-RD Mood Scale may be used to compare prevalent moods at the various stages of this progressive disease. It may be used also as an outcome measure for interventional studies designed to improve mood and improve the quality of life of individuals with AD-RD.

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**TABLE 1**  
Factor Loadings: Alzheimer's Disease and Related Dementias Mood Scale

Factor 1 (spirited)	Factor 2 (hostile)	Factor 3 (contented)	Factor 4 (apathetic)	Factor 5 (sad)
Wants attention	1.00	Hateful	1.00	1.00
Sense of humor	.96	Aggressive	.92	.79
Euphoric (very high spirits)	.95	Angry	.88	.59
Wants affection, love	.93	In bad mood	.71	.51
Likes to do things	.90	Upset	.65	-.50
Jovial	.90	Irritated	.69	.42
Affectionate	.89	Cooperative (reverse scored)	-.48	
Likes to be busy	.87			
Enthusiastic	.85	Suspicious, paranoid	.46	
Talkative	.78			
In good spirits	.75			
Bright, alert	.52			
Energetic <sup>d</sup>	.47			

*Note.* Items loading at .40 or better were retained.

<sup>a</sup> Deleted after item-to-total and interitem analysis.



TABLE 2

Alzheimer's Disease and Related Dementias Mood Scale

		Never	Occasionally	Sometimes	Often	Always
1.	In bad mood	1	2	3	4	5
2.	Upset	1	2	3	4	5
3.	Angry	1	2	3	4	5
4.	Suspicious, paranoid	1	2	3	4	5
5.	Hateful	1	2	3	4	5
6.	Irritated	1	2	3	4	5
7.	Aggressive	1	2	3	4	5
8.	Cooperative*	5	4	3	2	1
9.	Apathetic	1	2	3	4	5
10.	Lost	1	2	3	4	5
11.	Lack of expression (flat affect)	1	2	3	4	5
12.	Attentive*	5	4	3	2	1
13.	Quiet	1	2	3	4	5
14.	Depressed	1	2	3	4	5
15.	Sad	1	2	3	4	5
16.	Tearful	1	2	3	4	5
17.	Wants to die	1	2	3	4	5
18.	Relaxed	1	2	3	4	5
19.	Calm	1	2	3	4	5
20.	Accepting	1	2	3	4	5
21.	Feels safe, secure	1	2	3	4	5
22.	Content	1	2	3	4	5
23.	Wants attention	1	2	3	4	5
24.	Sense of humor	1	2	3	4	5
25.	Euphoric (very high spirits)	1	2	3	4	5
26.	Wants affection, love	1	2	3	4	5
27.	Likes to do things	1	2	3	4	5
28.	Jovial	1	2	3	4	5
29.	Affectionate	1	2	3	4	5
30.	Likes to be busy	1	2	3	4	5

		Never	Occasionally	Sometimes	Often	Always
31.	Enthusiastic	1	2	3	4	5
32.	Talkative	1	2	3	4	5
33.	In good spirits	1	2	3	4	5
34.	Bright, alert	1	2	3	4	5

Directions: Please think about the way (participant) has been in the last 7 days and indicate how often each word would have described him or her over the last week. Items marked with an asterisk (\*) are reverse scored. Subscales: hostile = Items 1, 2, 3, 4, 5, 6, 7, and 8 (reversed as indicated); apathetic = Items 9, 10, 11, 12 (reversed as indicated), and 13; sad = Items 14, 15, 16, and 17; contented = Items 18, 19, 20, 21, and 22; spirited = Items 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 34. Authors own the copyright for this table.

TABLE 3

Comparison of Subscale Means Across 2 Weeks' Time

Subscale	Time 1		Time 2		F	P
	M	SD	M	SD		
Spirited	38.78	10.36	37.24	9.21	.49	.4852
Hostile	11.94	4.80	11.15	3.62	.69	.4852
Contented	20.00	3.97	19.77	3.13	.08	.7814
Apathetic	10.57	3.88	10.84	3.27	.18	.7115
Sad	6.84	2.72	7.02	2.27	.11	.7465

Note. n = 39

**TABLE 4**

Standardized Cronbach's Coefficient Alpha Values by Stage of Dementia for the Five Subscales

Subscale	Stage		
	Early <sup>a</sup>	Middle <sup>b</sup>	Late <sup>c</sup>
Spirited	.90	.92	.90
Hostile	.79	.88	.88
Contented	.85	.84	.84
Apathetic	.71	.63	.76
Sad	.71	.79	.69

Note. MMSE = Mini-Mental State Examination.

<sup>a</sup>MMSE >19, *n* = 55.

<sup>b</sup>MMSE 10-19, *n* = 111.

<sup>c</sup>MMSE <10, *n* = 119.

**TABLE 5**  
Comparison With Other Mood and Affect Measures: Correlation and Significance

Subscale	Dementia mood assessment scale	Cornell scale for depression in dementia	Montgomery-Asberg depression rating scale	Observed affect rating scale 2-week negative	Observed affect rating scale 2-week positive
Spirited	-.63 <.0001	-.57 <.0001	-.68 <.0001	-.48 <.0001	.47 <.0001
Hostile	.66 <.0001	.61 <.0001	.61 <.0001	.65 <.0001	-.51 <.0001
Contented	-.71 <.0001	-.68 <.0001	-.74 <.0001	-.56 <.0001	.60 <.0001
Apathetic	.80 <.0001	.72 <.0001	.80 <.0001	.50 <.0001	-.68 <.0001
Sad	.67 <.0001	.65 <.0001	.57 <.0001	.54 <.0001	-.41 <.0001

*Note.*  $n = 87$ .



TABLE 6  
Subscale Discrimination Between Individuals With Impairment With Depressive Symptoms and Those Without

Subscale	Depressed <sup>a</sup>		Not depressed <sup>b</sup>		F	P
	M	SD	M	SD		
Spirited	30.25	8.17	37.50	10.88	12.13	.0008
Hostile	18.16	6.05	12.80	4.44	21.48	.0001
Contented	15.23	4.22	19.28	4.10	25.32	.0001
Apathetic	14.46	3.94	10.54	3.80	21.63	.0001
Sad	8.00	2.69	6.33	5.04	9.93	.0023

<sup>a</sup>Cornell Scale for Depression in Dementia score >7.

<sup>b</sup>Cornell Scale for Depression in Dementia score ≤7.

TABLE 7  
Comparison of Subscale Scores Across Stages of Dementia

Stages of Alzheimer's disease									
Subscale	Early <sup>a</sup>		Middle <sup>b</sup>		Late <sup>c</sup>		F	P	
	M	SD	M	SD	M	SD			
Spirited	36.78	10.18	34.33	10.42	30.54	9.93	8.12	.0004	
Hostile	12.98	4.25	14.75	5.71	16.92	6.32	9.75	.0001	
Contented	18.80	4.18	18.51	3.91	16.89	4.15	6.21	.0023	
Apathetic	10.03	3.38	11.16	3.47	14.99	4.49	41.34	.0001	
Sad	6.92	2.50	7.09	2.68	7.73	2.07	2.43	.0900	

Note. MMSE = Mini-Mental State Examination.

<sup>a</sup>MMSE >19, n = 55.

<sup>b</sup>MMSE 10-19, n = 111.

<sup>c</sup>MMSE <10, n = 118.